ABSTRACT

The fifth Generation (5G) mobile communications system is different from previous generations that only focus on enhanced Mobile Broadband (eMBB), but also adds Massive Machine Type Communications (mMTC) and Ultra-Realible and Low Latency Communications (URLLC). Orthogonal Multiple Access (OMA) is a realistic choice for achieving good performance in terms of system-level throughput. But on a 5G system, one further requirement is improvement spectral efficiency. Non-Orthogonal Multiple Access (NOMA) is one of the promising multiple access schemes to improve spectral efficiency.

NOMA is a system that allows multi-user use the same time-frequency resource. NOMA applies Superposition Code (SC) on the transmitter side and Succesesive Interference Cancellation (SIC) on the receiver side. NOMA has two categories, Power-Domain (PD) and Code-Domain (CD). In PD-NOMA, SC is used to multiplexed multi-user signals with different power allocations based on the feedback channel gain of each user. SIC is used to eliminate multi-user interference which is using the same time-frequency resource. SIC is applied for user with weak power allocation.

In this Final Project PD-NOMA is simulated in the downlink direction. The number of users using the same resource block is two. With the condition that user 1 does not implement SIC and user 2 applies SIC. Simulation results show BER values below 10-6 when user 1 power allocation has a value of 0.65 to 0.9 and user 2 power allocation has a value of 0.45 to 0.1. The range of SNR requirements between users so that the BER is below 10-6 is quite far except when the power allocation is 0.8: 0.2. the value of SNR and channel capacity in user 1 are lower than user SNR 2 because in user 1 the signal from user 2 is considered as noise. The total PD-NOMA channel capacity is greater than OFDMA when the user power allocation is significantly different.

Kata Kunci: *Non Orthogonal Multiple Access, Power Domain, Fix Power Allocation, Succesesive Interference Cancellation*